Claims

1. A device for detecting electromagnetic radiation (910), comprising

a receiver (12) which outputs an output signal in dependence on the electromagnetic radiation;

a means (24) for varying a sensitivity of the receiver (12);

an energy store (20) which is connectable to the receiver (12) and whose stored energy is changed, in a connected state, in accordance with the output signal; and

a control means (912) for periodically resetting the energy store (20) to a predetermined reference energy value, and for controlling the means (24) for varying the sensitivity such that

between two successive resetting events (68, 70; 168, 192), the sensitivity is high at least once (76, 78, 80, 82; 176, 178, 180, 182) and is low at least once,

a state of the energy store (20) giving an indication of the electromagnetic radiation.

2. The device as claimed in claim 1, wherein the receiver (12) includes a semiconductor pn transition (12) generating charge carriers in dependence on the electromagnetic radiation.

3. The device as claimed in claim 2, wherein the means (24) for varying is a controllable voltage source (24) for applying a variable cutoff voltage to the pn transition (12), the control means (912) being

configured to vary the voltage of the voltage source (24) such that the space-charge region has a higher expansion (B; II) for a high sensitivity than for a low sensitivity (A; I).

4. The device as claimed in claims 2 or 3, wherein the energy store (20) is a capacitance (20) which is charged or de-charged by a photocurrent generated in the pn transition (12).

5. The device as claimed in claim 4, wherein the capacitance includes a capacitor (20) which is connectable to the pn transition (12) such that same is de-charged by the photocurrent generated in the pn transition (12).

6. The device as claimed in claims 4 or 5, wherein the capacitance includes a barrier-layer capacitance of the pn transition (12) which is charged by the photocurrent generated in the pn transition (12).

7. The device as claimed in claim 5, while referring back to claim 3, wherein the capacitor (20) may be connected in series between the pn transition (12) and the controllable voltage source (24).

8. The device as claimed in claim 1, further comprising

a counterpart receiver (12b), the receiver (12a) including a first pn transition (12a) which generates first charge carriers in dependence on the electromagnetic radiation, the counterpart receiver (12b) including a second pn transition (12b) which generates second charge carriers in dependence on the electromagnetic radiation;

a counterpart energy store (20b), the energy store (20a) including a first capacitor (20a), and the

counterpart energy store (20b) including a second capacitor (20b),

the means (24) for varying being a controllable voltage source (24) for generating a variable voltage difference between a first voltage terminal and a second voltage terminal, and the first capacitor (20a) being connected, between the two successive resetting operations, between the first pn transition (12a) and the first voltage terminal, and the second capacitor (20b) being connected, between the two successive resetting operations, between the second pn transition (12b) and the second voltage terminal; and

the control means (912) being configured to simultaneously reset the first capacitor (20a) and the second capacitor (20b) and to control the controllable voltage source (24) with one clock such that in subsequent clock cycles between the two successive resetting operations, a space-charge region of the first photodiode is larger, and a space-charge region of the second photodiode is smaller, at one time, and the other time, the space-charge region of the first photodiode is smaller, and the space-charge region of the second photodiode is larger.

9. The device as claimed in any of claims 2 to 8, further comprising:

a shield (10) for shielding the photodiode (12) from the radiation having started interacting with the object (906) and having an expansion around the pn transition (12) which corresponds to the expansion of a space-charge region of the pn transition (12) when same is in a state of low sensitivity.

10. The device as claimed in any of claims 1 to 9, wherein the electromagnetic radiation is pulsed, and wherein

the control means (912) is configured to control the means for varying such that between two successive resetting events, the sensitivity is switched between high and low sensitivity, and that the switching is synchronized with pulse time periods (60, 62; 154, 156) during which the electromagnetic radiation is emitted.

11. The device as claimed in claim 10, wherein the receiver includes a pn transition and wherein a shielding structure is formed around the pn transition to drain off spurious charges in the receiver caused by interfering electromagnetic radiation in times between the pulse time durations.

12. A system for 3D-measuring of an object, comprising:

a pulsed light source (908) for illuminating the object (906) in a pulsed manner with pulsed electromagnetic radiation;

a plurality of devices as claimed in claim 10, the receivers of which are arranged in a matrix (902), and the control means (912) of which is configured to perform the synchronization of toggling with regard to the pulsed illumination of the pulsed light source;

an imaging means (904) for imaging the object onto the matrix; and

an evaluation means (912) for producing 3D information about the object on the basis of the states of the energy store of the plurality of devices.

13. The device as claimed in claim 12, wherein the evaluation means (912) is configured to calculate, from the states of each energy store (20), the

distance from a point on the object (906) which is imaged onto the receiver of this energy store.

14. A method for operating a receiver for detecting electromagnetic radiation, comprising:

resetting an energy store (20) which is connectable to a receiver (12), which outputs an output signal in dependence on the electromagnetic radiation, and the stored energy of which is changed, in a connected state, in accordance with the output signal;

varying a sensitivity of the receiver (12); and

periodically resetting the energy store (20) to a predetermined reference energy value, and controlling the means (24) for varying the sensitivity such that

between two successive resetting events (68, 70; 168, 192), the sensitivity is high at least once (76, 78, 80, 82; 176, 178, 180, 182) and is low at least once,

a state of the energy store (20) giving an indication of the electromagnetic radiation.